Department of Information Technology

B.Tech. (Information Technology)

MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

S. No.	Course Code	Course Name	CO No.	Course Outcomes (After completing the course students will be able to…..)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PO3
1	1FY2-01	Engineering Mathematics-I	CO1	Apply the basic concepts definite integrals, sequence and series, periodic functions and multivariable functions.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Apply the properties of beta and gamma function, convergence of sequence and series.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Apply properties of beta and gamma functions and definite integrals to find surface area and volumes of revolution. They will be able to apply partial derivatives and multiple integrals to solve many problems in science and engineering.	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyse Fourier series to make many useful deductions which lay down foundation of signal processing and image processing.	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1FY2-02	Engineering Physics	CO1	Describe the concepts of Wave and Quantum mechanics, Laser and Fiber optics, material science and electromagnetic theory. (Recall/Remembering)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain the different applications of Laser and optical fibers in communication, engineering, medicine and Science. Application of Hall effect (Examine)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Evaluate energy states in 1-D and 3-D box with the application of quantum mechanics.(Apply)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyze the crystal structure through X-ray Diffraction & wavelength of light through Newton's ring experiment and Michelson- interferometer ,types of materials through Hall effect . (Analyze)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1FY1-05	Human Values	CO1	Relate sustained happiness through identifying the essentials of human values and skills	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO2	Find the happiness and human values in terms of personal and social life to create harmony in them	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
			CO3	Use and understand practically the importance of trust, mutually satisfaction and human relationship	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO4	Identify the orders of nature for the holistic perception of harmony for human existence	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO5	Implement professional ethics and natural acceptance of human values in his/her life	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
4	1FY3-06	Programming for Problem Solving	CO1	Understand the basic concepts of fundamental of computer system, number system and programming. (Remembering)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain various memory units, representation of number system and Conditional, Iterative statements using arrays, string, pointers, file structure. (Understanding)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Examine the concept of algorithms, flowchart, Operators, Pointer, Array, String, structure, union using modularization to solve complex problems using C Programming (Applying)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Illustrate the User Defined functions, Memory management and File concepts to solve real time problems using C Programming (Analyzing)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	1FY3-09	Basic Civil Engineering	CO1	Describe Scope, role and Specialization of Civil Engineering, basics of surveying, types of building, Plinth area, carpet area, floor space index, R.C.C., mode of transportation and different causes of pollution. (Remember)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain solid waste management, building by-laws, concept of sun light and ventilation, chemical and hydrological cycle, biodiversity, causes of road accident, sanitary landfill and on-site sanitation, food chain and food web, contour maps, Global warming, Climate Change, Ozone depletion, and Green House effect. (Understand)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Illustrate method of ranging and levelling, road safety measures, building component, environmental acts, different types of foundation, treatment and disposal of waste water, traffic sign and symbol and rain water harvesting. (Apply)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Compute errors in linear measurement, bearings and elevations of respective points on the ground. (Analyze)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1FY2-20	Engineering Physics Lab	CO1	Operate the various devices for the multifarious use in the relative fields.	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO2	Apply knowledge of Newton's Ring,grating, spectrometer,Optical fiber ,Sextant, Hall effect , a n d L a s e r to determine wavelength of light, dispersive power,Numerical aperature Height of Object, Hall coefficient, coherence length and coherence time	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-
			CO3	To conduct the experiments with interest and an attitude of learning.	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO4	Evaluate the Band Gap and time constants (t=RC) using basic principles of semiconductors and Capacitors by graphs.	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-
7	1FY1-23	Human Values Activities and Sports	CO1	Recall the natural and social issues and their remedies.	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
			CO2	Describe the nature of human values and the impact of external factors over it.	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
			CO3	Validate through actions the significance of trust, respect and harmony with self and surroundings.	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			CO4	Outline the relation of human with nature and other factors in terms of human existence	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
			CO5	Associate the knowledge of self and society with clear understanding of social issues and the human beings.	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
9	1FY3-27	Basic Civil Engineering Lab	CO1	Describe various sanitary fittings and water supply fittings	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Examine pH, Turbidity, Hardness and Total solids of given water sample	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Use of EDM and Total Station in the field	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Investigate the linear and angular measurements of the points on the ground and levelling	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO5	Students will show an ability to communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	2	3	2	-	-	-	-	-
			CO1	Relate the fundamental of C Programming as variable, operators and taxonomy to write a basic C Program	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

9	**1FY3-24**	**Computer Programming Lab**	CO2	Write programs that perform operations using condition control statements and loop control statements, single and multi-dimensional arrays along with specific program of matrix multiplication.(Examine)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Use C programs to implement operations related to Array, Macros and inline functions, Dynamic memory allocations, concept of Structure, Unions and Pointers	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Students will show an ability to communicate effectively and work ethically	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-
10	**1FY3-28**	**Computer Aided Engineering Graphics**	CO1	Describe engineering drawing terminology, concept of scales and conic sections.	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO2	Draw Projection of Points, lines, planes, solids and section of solids	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO3	Draft 2D engineering problems on CAD software.	-	-	-	-	3	-	-	-	-	-	-	-	-	1	1
			CO4	Students will show an ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
11	**2FY2-01**	**Engineering Mathematics-II**	CO1	Apply the basic rank of matrix to find, eigen values and eigen vectors of the matrix, degree and order of differential equations.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Apply the complementary functions and particular integral of ordinary differential equation and various methods of solution of ODE to solve complex engineering problems.	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Apply an appropriate analytical technique to find solution of first order and higher order differential equations.	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Apply the higher order partial differential equations and analyze a wide variety of time dependent phenomena of real world including heat conduction, wave equation particle diffusion.	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
12	**2FY2-03**	**Engineering Chemistry**	CO1	Describe characteristics of water, fuel and Engineering materials-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
			CO2	Determine of hardness of water and calorific value of fuels for Industrial as well as domestic purposes	2	-	-	-	-	-	-	-	-	-	-	-	1	-	
			CO3	Compare different techniques of water treatment, fuel analysis, Manufacturing of engineering materials and corrosion protection methods	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Prepare the generic drugs or medicines by identifying the applications of organic reaction mechanism and manufacturing of engineering materials	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
13	**2FY1-04**	**Communication Skills**	CO1	Describe the process of communication, basics of Grammar and Writing and Literary Aspects	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
			CO2	Explain the types of communication, barriers and channels of communication and the concept of Literature through Short Stories and poetry	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			CO3	Write and prepare professional reports, paragraph and business letters with the correct use of grammar	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
			CO4	Discuss and illustrate the impact of social and moral values by implying the basics of English Writing Skills through literary aspects	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO5	Restate and outline the basic areas of English Language Skills with the applications of literature	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
14	**2FY3-07**	**Basic Mechanical Engineering**	CO1	Apply the basic concepts of thermal and manufacturing process.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Apply the different types of thermal and manufacturing processes and.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Apply the the functioning of turbine & pumps, IC engines, refrigeration system, modes of transmission of power, materials and primary manufacturing process.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Apply the the fundamental knowledge of thermal engineering, in addition to understanding of power transmission to solve the industrial and societal issues.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
15	**2FY3-08**	**Basic Electrical Engineering**	CO1	Identify basic components of electrical engineering and connect them to form different circuits to verify basic laws.Understanding	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Analyse the output of rectifier circuit,AC and DC machines to solve problems assosciated with Basic electrical engineering.Analyse	2	3	-	-	-	-	-	-	-	-	-	1	-	-	-
			CO3	Contribute efficiently in a team to acieve desired response of AC and DC Machines. Team Work	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
			CO4	Demonstrate the output of rectifier circuits consistiong of basic components of electrical engineering. Mechanism	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-
16	**2FY2-21**	**Engineering Chemistry Lab**	CO1	Determine the strength of unknown solution by volumetric analysis.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Examine the characteristics of lubricating oil in groups	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			CO3	Analyze different characteristics of water and fuel to solve societal and enviornmental problems	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
			CO4	Students will show an ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
17	**2FY1-22**	**Language Lab**	CO1	Use and pronounce the words correctly.	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
			CO2	Acquire knowledge of the correct expressions,vocabulary etc. in personal and professional lives.	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
			CO3	Plan successfully for leadership and teamwork,crack GD's, interviews and other professional activities.	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			CO4	Synthesize the process of communication using LSRW.	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
18	**2FY3-25**	**Manufacturing Practices Workshop**	CO1	Describe the working of Lathe machine.	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO2	Apply the basic concepts of Foundry Shop	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO3	Develop various carpentry joints, welding joints and sheet metal objects.	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO4	Students will show an ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
19	**2FY3-26**	**Basic Electrical Engineering Lab**	CO1	Discuss measurement of electrical quantites	1	-	-	-	-	-	-	-	-	-	-	-	1	2	-
			CO2	Compare different connections of transformer	2	-	-	-	-	-	-	-	-	-	-	-	1	2	-
			CO3	Demonstrate constructional features of electrical machines and converters	3	-	-	-	-	-	-	-	-	-	-	2	2	-	
			CO4	Students will show an ability to communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	2	3	2	-	-	-	-	-
20	**2FY3-29**	**Computer Aided Machine Drawing**	CO1	Describe orthographic projections and basic Geometrical Concept	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO2	Analyze Sectional Views of different mechanical Components and assembly drawing	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO3	Draft a engineering product using CAD software	-	-	-	-	2	-	-	-	-	-	-	-	2	-	1
			CO4	Students will show an ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
			CO1	Describe the fundamental concepts of Economics and Financial Management and define the meaning of national income, demand, supply, cost, market structure, and balance sheet.	-	-	-	-	-	1	-	-	-	2	3	-	-	-	-

21	**3IT1-03**	**Managerial Economics and Financial Accounting**	CO2	Calculate the domestic product, national product and elasticity of price on demand and supply.	-	2	-	-	-	-	-	-	-	-	3	-	-	-	1
			CO3	Draw the cost graphs, revenue graphs and forecast the impact of change in price in various perfect as well as imperfect market structures.	3	-	2	-	-	-	-	-	-	-	-	-	-	-	1
			CO4	Compare the financial statements to interpret the financial position of the firm and evaluate the project investment decisions.	-	3	-	2	-	-	-	-	-	-	3	-	-	-	1
22	**3IT4-05**	**Data Structures and Algorithms**	CO1	Define and compare various Linear and Non-Linear Data Structures along with their applications.	-	-	3	2	-	-	-	-	-	-	2	2	2	1	-
			CO2	Explain the memory representation of arrays, linked lists, stacks, queues, trees, and graphs; and apply various operations on these data structures.	-	-	-	3	-	-	-	-	-	-	2	2	3	1	1
			CO3	Choose appropriate data structure for the specified problem definition and compare the benefits of dynamic and static implementation of data structures.	-	-	3	2	-	-	-	-	-	-	2	3	3	-	1
			CO4	Select appropriate sorting and searching technique for an application and explain the concept of Hashing.	-	-	3	2	-	-	-	-	-	-	-	2	3	-	1
23	**3IT3-04**	**Digital Electronics**	CO1	Describe number representation and conversion between different number representation .	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO2	Apply different simplification methods for digital logic .	3	3	-	-	-	-	-	-	-	-	-	2	-	-	2
			CO3	Compare various logic family.	3	3	-	-	-	-	-	-	-	-	-	2	2	-	-
			CO4	Design sequential and combinational logic circuit for given problem.	3	3	-	-	-	-	-	-	-	-	-	2	-	2	-
24	**3IT4-06**	**Object Oriented Programming**	CO1	Explain basic object oriented programming concepts and principles through C++ language.	3	3	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO2	Apply the concepts of classes and objects while designing applications.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Identify the need to use memory handling and pointer concepts in various applications.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO4	Assess the types of Inheritance according to the need of application designing.	-	3	-	-	-	-	-	-	-	-	-	2	-	3	-
			CO5	Construct the applications using generic programming, exception handling and file handling.	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3
25	**3IT4-07**	**Software Engineering**	CO1	Plan software development life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements.	-	3	2	-	-	-	-	-	-	-	-	2	-	3	2
			CO2	Able to use engineering tools necessary for software project management, evaluate cost estimation and risk analysis.	-	3	2	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Identify and outlines the engineering process of software requirement analysis.	3	3	3	-	-	-	-	1	-	-	-	2	3	3	3
			CO4	Analyze and translate a specification into design, and then realize that design practically, using an appropriate software engineering methodology.	2	3	3	2	-	-	-	2	-	-	2	3	3	3	3
			CO5	Explain the object- oriented software development process.	3	3	3	3	3	-	-	2	-	-	2	2	3	2	2
26	**3IT2-01**	**Advanced Engineering Mathematics**	CO1	Describe probability models using probability mass (density) functions ,need and classification of optimization terminology.	2	2	3	3	3	-	-	2	-	-	3	3	2	2	3
			CO2	Determine the probability distributions of discrete and continuous random variables and work binomial, Poisson, uniform, exponential, normal distribution and their statistical measures	2	3	3	2	-	-	-	-	-	-	2	3	2	2	3
			CO3	Interpret the correlation between two variables and regression applications for purposes of description and prediction.	3	2	2	-	-	-	-	-	-	-	-	1	2	-	1
			CO4	Create mathematical models of the real world problems in optimization. For example: Finance, Budgeting, Investment, Transportation, Traveling salesman and many more such problems	3	3	2	2	-	-	-	-	-	-	-	1	2	-	-
			CO5	Solve Assignments and transportation problems using linear programming methods.	3	2	2	2	-	-	-	-	-	-	-	1	2	-	-
27	**3IT4-23**	**Software Engineering Lab**	CO1	Develop a systematic, disciplined and quantifiable approach to the development, operation and maintenance of software.	3	3	3	3	-	-	-	-	-	-	-	1	2	-	1
			CO2	Develop Software Requirements Specification (SRS) for a given problem.	3	2	2	2	-	-	-	-	-	-	-	1	3	-	2
			CO3	Use appropriate CASE tools in the software life cycle.	-	2	2	-	-	-	-	-	2	-	2	2	3	2	2
			CO4	Develop DFD model using structured design.	-	3	3	-	-	-	-	-	2	-	2	3	3	2	-
			CO5	Develop projects using object-oriented design and UML.	-	2	2	-	-	-	-	-	2	-	3	2	3	3	2
28	**3IT4-21**	**Data Structures and Algorithms Lab**	CO1	Compare and implement elementary data structures such as stacks, queues, linked lists, trees and graphs.	-	3	3	-	2	-	-	-	2	-	3	3	-	-	2
			CO2	Identify the appropriate data structure for a given problem.	-	3	2	-	2	-	-	-	2	-	2	2	2	2	3
			CO3	Select and implement appropriate sorting/searching technique for given problem.	-	-	2	1	-	-	-	-	-	-	1	1	3	2	1
			CO4	Implement various operations like creation, insertion, deletion and traversal on Linear and Non-Linear data structures.	-	2	3	-	-	-	-	-	-	-	-	1	2	2	1
29	**3IT4-24**	**Digital Electronics Lab**	CO1	Understand Digital Circuits & Systems	-	-	3	-	-	-	-	-	-	-	-	1	-	2	-
			CO2	Verify truth tables of basic logic gates.	-	2	2	-	-	-	-	-	-	-	-	2	-	-	2
			CO3	Realize and verify different types of logic gates.	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO4	Realize different types of Combinational and Sequential circuits	-	-	3	2	2	-	-	-	-	-	3	3	-	2	-
30	**3IT4-22**	**Object Oriented Programming Lab**	CO1	Demonstrate the knowledge of C++ programming language (its syntax, characteristic),objects and class concepts, and different Types of conversion techniques in C++.	-	-	3	2	2	-	-	-	-	-	3	3	3	-	-
			CO2	Apply different memory allocation techniques and functions in C++	-	-	3	3	2	-	-	-	-	-	3	3	-	3	-
			CO3	Implement Inheritance concept in C++ programming model	-	-	3	2	-	-	-	-	-	-	3	3	-	-	3
			CO4	Formulate abstract classes with help of polymorphism in C++	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2
31	**3IT7-30**	**Industrial Training**	CO1	Identify the importance of emerging technologies and advancements	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Explain the theoretical aspects directly viewing development and other activity in industry and can decide his/her career.	-	3	-	-	-	-	-	-	-	-	-	-	-	-	2
			CO3	Develop the practical skill, team work and ethical thinking while working in industry.	-	-	-	-	-	-	-	3	3	-	-	-	-	2	-
			CO4	Communicate effectively through technical presentation, report and interactions.	-	-	-	-	-	2	-	-	-	3	-	-	2	-	-
			CO5	Present and demonstrate the report using modern tools.	-	-	-	-	3	-	-	-	-	-	-	-	2	-	-

32	4IT2-01	Discrete Mathematics Structure	CO1	Demonstrate knowledge of how Sets, Relations , functions , Permutations and combinations and Graph are defined.	-	-	3	-	-	-	-	-	2	2	-	-	3	-	-
			CO2	Apply the rules of inference , methods of proof including direct and indirect proof forms, proof by contradiction, mathematical induction, Pigeonhole Principles, logic sentence in terms of predicates, quantifiers, and logical connectives.	-	3	-	-	2	-	-	-	2	2	-	2	-	3	-
			CO3	Analyze truth tables, tautologies, normal forms in propositional calculus .	-	-	3	-	2	-	-	-	2	2	-	2	-	-	3
			CO4	Explain finite-state machines to recognize certain sets and graph theory to model relationships and solve problems.	-	3	2	-	2	-	-	-	2	2	-	2	-	3	2
			CO5	Identify recurrence relations , generating functions, concepts and properties of algebraic structures such as groups, rings and fields.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	4IT1-02	Technical Communication	CO1	Describe the objective, scope and outcome of the course.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO2	Discuss and understand the process of technical communication in terms of LSRW.	3	2	2	2	-	-	-	-	-	-	-	1	3	1	1
			CO3	Explain the concept of Technical Materials/Texts along with the understanding of technical documents.	3	3	2	2	-	-	-	-	-	-	-	1	3	2	1
			CO4	Write and prepare various professional correspondence documents along with the knowledge of basics of grammar	3	3	2	2	-	-	-	-	-	-	-	1	3	2	1
			CO5	Restate and outline the basic concepts of Technical Reports, articles and their formats.	3	2	2	2	-	-	-	-	-	-	-	1	3	1	1
34	4IT3-04	Principle of Communication	CO1	Understand different modulation and demodulation techniques used in analog communication	1	-	-	-	-	-	-	-	-	-	-	3	-	2	-
			CO2	Identify and solve basic communication problems	-	-	-	-	2	-	-	-	2	3	-	3	-	-	2
			CO3	Analyze transmitter and receiver circuits	-	-	-	-	-	-	-	-	-	3	-	3	2	-	-
			CO4	Compare and contrast design issues, advantages, disadvantages and limitations of analog and digital communication systems	-	-	-	-	2	-	-	-	2	3	-	3	-	2	-
35	4IT4-05	Database Management System	CO1	Explain fundamental concepts of a database management system.	-	-	-	-	2	-	-	-	-	3	-	3	-	3	-
			CO2	Identify entities, attributes and their relationship and Model data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.	3	3	3	-	-	-	-	-	-	3	-	3	3	-	3
			CO3	Formulate the SQL queries for any types of DBMS problems.	3	3	3	-	-	-	-	-	-	-	-	2	3	2	2
			CO4	Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.	3	3	-	-	-	-	-	-	-	-	-	3	3	2	3
			CO5	Determine different serializability and Formulate concurrent schedule and Recovery of database using available techniques.	3	3	3	-	-	-	-	-	-	-	-	-	2	2	3
36	4IT4-06	Theory of Computation	CO1	Classify and compare the Automata, Grammars, Languages and Computational problems based on their properties and hierarchy	3	-	-	-	-	-	-	-	-	-	-	-	-	3	-
			CO2	Apply Pumping lemmas of respective languages to determine the grammar and solve problems related to Normal Forms, transformation of automata, and parsing	-	3	-	-	-	-	-	-	-	-	-	-	3	-	3
			CO3	Analyze the working of Automata and Turing Machines	-	3	-	3	-	-	-	-	-	-	-	-	-	3	2	2
			CO4	Construct the required automata based on the given criteria of string acceptability and/or state transformations	-	3	-	-	-	-	-	-	-	-	-	-	3	2	3
37	4IT4-07	Data Communication and Computer Networks	CO1	Acquire knowledge about Network hardware and network software along with architectures of networking	3	-	-	-	-	-	-	-	-	-	-	-	2	2	3
			CO2	Analyse the concept of error detection and correction in data link layer using different methods.	3	-	-	-	-	-	-	-	-	-	-	-	2	2	3
			CO3	Apply the different routing methods and congestion control mechanism in networking.	-	3	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO4	Design network topologies thereby handling design issues, application layer protocol along with network.	-	-	3	-	-	-	-	-	-	-	-	-	2	2	3
38	4IT4-21	Linux Shell Programming Lab	CO1	Apply the basic commands of linux operating system related to file and directory manipulation	-	-	3	-	-	-	-	-	-	-	-	-	2	3	2
			CO2	Demonstrate the use of commands related to inode, I/O Redirection and piping, process control commands and mails	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO3	Create Shell scripts with implementation of control statements, looping, cases, and arrays to address corresponding problem statements	-	3	-	-	-	-	-	-	-	-	-	2	-	3	-
			CO4	Create shell scripts for developing specific applications for geometrical shape creation, calculators and other problem statements	-	3	2	-	-	-	-	-	-	-	-	2	-	-	3
39	4IT4-22	Database Management System Lab	CO1	Analyse data requirements of an application and design the database using ERD as a tool.	-	3	2	-	-	-	-	-	-	-	-	-	-	3	2
			CO2	Retrieve data from the database by writing appropriate query in SQL using sql tool	-	-	2	-	3	2	-	-	-	-	-	-	2	-	3
			CO3	Apply the required constraints on various tables like Primary Key, Referential Integrity Constraints, check constraint etc.	-	2	-	2	3	2	-	-	-	-	-	-	-	2	-
			CO4	Implement triggers for various DML operations.	-	-	2	2	3	-	-	-	-	-	-	-	2	-	3
40	4IT4-23	Network Programming Lab	CO1	Analyse the network devices to interface a LAN and simulate.	-	2	-	3	2	3	-	-	-	-	-	-	-	2	3
			CO2	Develop LAN system to communicate with router and servers.	-	-	-	3	-	-	-	-	-	-	-	-	3	1	-
			CO3	Implement algorithms for identifying errors in communication networks.	-	-	-	-	-	-	-	-	-	-	-	2	2	-	3
			CO4	Design a client server channel establishment for message passing using communication protocol.	-	-	3	-	-	-	-	-	-	-	-	2	2	2	3
41	4IT4-24	Java Lab	CO1	State basic Object Oriented features of Java.	-	-	2	2	-	-	-	-	-	-	-	1	2	2	3
			CO2	Develop applications using Packages and Interfaces.	-	-	3	-	-	-	-	-	2	2	-	-	3	-	-
			CO3	Implement Process String objects through predefined methods of String and StringBuffer classes.	-	3	-	-	2	-	-	-	2	2	-	2	-	3	-
			CO4	Design applications that can handle Exceptions and demonstrate using Multi-threading and Applets.	-	-	3	-	2	-	-	-	2	2	-	2	-	-	3
			CO1	Use different functions, variables, syntax and different technical tools for building any application	-	3	2	-	2	-	-	-	2	2	-	-	-	3	2
			CO2	Design and implement a static web designing using HTML and CSS	-	-	3	2	-	-	-	-	-	-	-	-	2	1	-

42	**4IT4-25**	**Web Technology Lab**	CO3	Apply the knowledge of web technology in developing web applications.	-	3	2	2	-	-	-	-	-	-	-	-	3	1	1
			CO4	Evaluate different solutions in field of web application development.	-	3	2	2	-	-	-	-	-	-	-	-	3	-	1
			CO5	Implement small to large scale project to provide live solution in web application development fields.	-	-	3	2	-	-	-	-	-	-	-	-	3	-	1
43	**5IT3-01**	**Microprocessor And Interfaces**	CO1	Describe the architecture and organization of Microprocessor along with Instruction Set format.	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO2	illustrate the operation of various instructions and addressing modes.	-	3	-	-	-	-	-	-	-	-	-	-	-	-	2
			CO3	Compare the various interrupts and Delay Techniques.	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
			CO4	Develop assembly language program using various programming tools for given problem.	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
			CO5	Design Interfacing of Microprocessor with External Device.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	2
44	**5IT4-02**	**Compiler Design**	CO1	Describe the phases of the compilation process and other implicit phase specific procedures	-	3	-	-	-	-	-	-	-	-	2	2	2	-
			CO2	Compare different parsing methods, error handling methods, and parameter parsing approaches	-	-	3	-	-	-	-	-	-	-	2	3	2	2
			CO3	Examine basic block and its control flow, TAC, DAG representation, optimizations sources, methods of code generation	-	-	3	-	-	-	-	-	-	-	-	2	2	-
			CO4	Analyze syntax directed definition, storage allocation, parameter passing and data structures using symbol tables	-	-	3	-	-	-	-	-	-	-	2	3	2	-
			CO5	Create compiler programs using YACC and Lex thereby constructing Lexical Analyzers and Parsers.	-	-	3	-	-	-	-	-	-	-	-	3	2	-
45	**5IT4-03**	**Operating System**	CO1	Describe the characteristics of different structures of the operating systems and identify the core functions of the operating systems.	3	-	-	-	-	-	-	-	-	-	-	2	-	2
			CO2	Interpret features and strengths of various contemporary operating systems (UNIX, Linux and Mobile OSs).	2	3	-	-	-	-	-	-	-	-	2	-	3	-
			CO3	Apply methods to solve basic problems related to core functioning of OS such as synchronization, scheduling, deadlocks, memory management, file management etc.	-	-	3	-	-	-	-	-	-	-	2	3	-	-
			CO4	Analyze and evaluate various policies and algorithms used for the management of processes, resource control, physical and virtual memory, scheduling, I/O and files.	-	-	3	-	-	-	-	-	-	-	2	-	-	3
46	**5IT4-04**	**Computer Graphics & Multimedia**	CO1	Understand the concept of different display techniques, 2D & 3D,Co-ordinate system and primitive drawing components like line, circle etc.	-	3	3	-	-	-	-	-	-	-	2	3	-	2
			CO2	Use geometric transformations on graphics objects and their application in composite form.	-	2	2	-	-	-	-	-	-	-	2	3	2	3
			CO3	Apply visible surface detection methods in 3D objects.	-	3	3	-	-	-	-	-	-	-	2	3	2	3
			CO4	Compare Illumination color models and clipping techniques to graphics application.	-	3	3	-	-	-	-	-	-	-	2	3	-	-
			CO5	Implement the concept and applications of multimedia in computer animation.	-	3	3	-	-	-	-	-	-	-	2	-	-	3
47	**5IT4-05**	**Analysis of Algorithms**	CO1	Explain design techniques of algorithm and concepts of complexity and Notations	-	3	3	2	-	-	-	-	-	-	-	3	-	2
			CO2	Analyze and evaluate time complexity of different computational problems in worst, best and average case	2	3	3	3	-	-	-	-	-	-	-	3	-	2
			CO3	Choose appropriate algorithm design techniques and formulate the solution of different computational problems.	2	3	3	3	-	-	-	-	-	-	-	3	-	2
			CO4	Design algorithmic solution to solve the computational problems using divide & conquer, Greedy, Dynamic Programming, Pattern Matching, Branch & Bound & approximation techniques.	2	3	3	3	-	-	-	-	-	-	-	3	-	2
48	**5IT5-12**	**Software Testing and Project Management**	CO1	Define and explain software project management concepts like project planning, organizing project teams, and roles of a Project Manager.	-	2	3	2	-	-	-	-	-	-	2	2	2	1	-
			CO2	Estimate effort and duration and calculate software size.	-	-	3	-	-	-	-	-	-	-	2	2	3	1	1
			CO3	Define and compare Black Box and White Box Testing.	-	-	3	2	-	-	-	-	-	-	2	3	3	-	1
			CO4	Explain various types of testing techniques and design test cases.	-	-	3	2	-	-	-	-	-	-	-	2	3	-	1
49	**5IT4-21**	**Computer Graphics & Multimedia Lab**	CO1	Write programs to draw two dimensional images using OpenGL.	-	2	2	3	-	-	-	-	-	-	-	2	2	2	2
			CO2	Implement algorithms for line, ellipse and circle drawing using OpenGL.	-	3	3	2	3	-	-	-	-	-	-	2	3	-	2
			CO3	Demonstrate algorithms of clipping of Images.	-	2	2	2	3	-	-	-	-	-	-	2	3	2	3
			CO4	Implement basic transformations on objects using OpenGL.	-	3	2	2	3	-	-	-	-	-	-	2	3	2	3
			CO5	Apply the concept of Color Generation on objects.	-	2	3	3	3	-	-	-	-	-	-	2	3	2	2
50	**5IT4-22**	**Compiler Design Lab**	CO1	Analyze various system programming concepts, by designing a lexical analyzer for pattern recognition in C Language	-	-	3	2	3	-	-	-	-	-	-	2	3	2	2
			CO2	Design programs to implement different parsing approaches thereby implementing parse tables.	-	-	3	2	-	-	-	-	-	-	-	2	3	2	-
			CO3	Construct a program for generating for various intermediate code forms, especially TAC, and Polish code.	-	-	3	2	-	-	-	-	-	-	-	2	2	2	2
			CO4	Create various storage allocation strategies, parameter passing and data structures using symbol tables	-	-	3	-	-	-	-	-	-	-	-	2	3	2	-
			CO5	Create a Lexical Analyzer using LEX, and language processor development using YACC.	-	3	2	2	3	-	-	-	-	-	-	2	3	2	2
51	**5IT4-23**	**Analysis of Algorithms Lab**	CO1	Analyze the time complexity of algorithm & synthesize efficient algorithms.	-	3	3	3	3	-	-	-	-	-	-	-	3	-	-
			CO2	Implement programs for classical sorting, searching problems using various design techniques of algorithm	-	3	3	3	2	-	-	-	-	-	-	3	3	-	2
			CO3	Implement programs for optimization and graph problems using various design techniques of algorithm	-	3	3	3	2	-	-	-	-	-	-	3	3	-	3
			CO4	Synthesize efficient algorithms for sorting, optimization, graph based problems	-	3	3	3	3	-	-	-	-	-	-	3	3	-	-
			CO1	Create a Swings application with GUI components and design Java Applet programs	-	3	-	-	2	-	-	-	-	-	-	2	2	-	-
			CO2	Connect a web application to a database using JDBC drivers, and construct Client Server programs	-	3	-	-	2	-	-	-	-	-	-	2	2	-	-

52	**5IT4-24**	**Advanced Java Lab**	CO3	Apply Java RMI to write distributed applications, and incorporate JNDI lookup and Object serializations.	-	-	3	-	3	-	-	2	-	-	-	-	3	2	2
			CO4	Analyze J2EE Architecture and develop programs to implement Java Servlets and Session Handling	-	-	3	2	3	-	-	2	-	-	-	2	2	3	3
			CO5	Design an application using JSP pages with XML tab library and integration of SQL functions.	-	-	3	2	3	-	-	2	-	-	-	2	3	3	3
53	**5IT7-30**	**Industrial Training**	CO1	Identify the importance of emerging technologies and advancements	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Explain the theoretical aspects directly viewing development and other activity in industry and can decide his/her career.	-	3	-	-	-	-	-	-	-	-	-	-	-	-	2
			CO3	Develop the practical skill, team work and ethical thinking while working in industry.	-	-	-	-	-	-	-	3	3	-	-	-	-	2	-
			CO4	Communicate effectively through technical presentation, report and interactions.	-	-	-	-	-	2	-	-	-	3	-	-	2	-	-
			CO5	Present and demonstrate the report using modern tools.	-	-	-	-	3	-	-	-	-	-	-	-	2	-	-
54	**6IT3-01**	**Digital Image Processing**	CO1	Explain the fundamental concepts of a digital image processing and Image Enhancement.	3	3	2	1	-	-	-	-	-	-	-	2	-	-	-
			CO2	Understand the need for image transforms and their properties.	2	3	2	1	-	-	-	-	-	-	-	2	2	2	2
			CO3	Compare spatial and frequency domain filtering techniques of image compression.	2	3	3	2	2	-	-	-	-	-	-	2	2	3	2
			CO4	Analyze image segmentation and representation techniques.	2	2	3	3	2	-	-	-	-	-	-	2	2	3	2
55	**6IT4-02**	**Machine Learning**	CO1	Differentiate various machine learning approaches, and to interpret the concepts of supervised, unsupervised and reinforcement learning.	-	3	3	-	-	-	-	-	-	-	-	-	2	2	2
			CO2	Illustrate the working of classifier models like SVM, Neural Networks and etc and identify classifier model for typical machine learning applications.	-	3	3	2	-	-	-	-	-	-	-	-	2	3	2
			CO3	Apply theoretical foundations of Machine learning algorithms to solve the different real word applications.	-	3	3	2	-	-	-	-	-	-	-	-	3	3	-
			CO4	Design solution for different application using Machine learning algorithms and identify its applicability in real life problems.	-	3	3	3	-	-	-	-	-	-	-	-	3	2	2
56	**6IT4-03**	**Information Security System**	CO1	Identify and classify system security threats and attacks with their effective counter measures	-	-	3	-	-	-	-	1	-	-	-	2	2	2	2
			CO2	Design and understand the structure and fucnctions of different encryption algorithms	-	3	2	-	-	-	-	1	-	-	-	3	2	3	2
			CO3	Apply and analyze the basic Cryptographic algorithm for security, including substitution, transposition, DES, AES, RSA	-	-	3	-	-	-	-	-	-	-	-	3	3	3	-
			CO4	Review different message authentication techniques and ability to apply them in practical applications	-	2	3	-	-	-	-	-	-	-	-	2	3	2	2
			CO5	Analyze the working of security over different level of web architecture.	-	-	3	-	-	-	-	-	-	-	-	2	3	2	2
57	**6IT4-04**	**Computer Architecture and Organization**	CO1	Classify and compare microoperations, common bus construction approaches, control, addressing modes, programming methods, register and memory organizations in basic computer	3	-	-	-	-	-	-	-	-	-	-	2	3	2	2
			CO2	Apply the concepts of Basic computer data types, number representation schemes, computer arithmetic algorithms, and programming approaches to implement hardwired and micro-programmed control	-	3	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Analyze and illustrate the architecture of RISC Systems, Pipelining and Vector Processing systems, Direct Memory Access, Input Output Processor and Multiprocessor Systems	-	-	3	-	-	-	-	-	-	-	-	2	3	2	2
			CO4	Develop the assembly language programs using programming constructs, and construct interconnections for ALU and Control Unit components	-	-	3	-	-	-	-	-	-	-	-	2	2	3	2
58	**6IT4-05**	**Artificial Intelligence**	CO1	Explain basic understanding and various applications of AI techniques in intelligent agents, expert systems, game playing, understanding natural language, robotics etc.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3
			CO2	Describe core concepts and algorithms of AI including searching, knowledge and reasoning, game playing, planning, various types of learning, natural language processing, expert system, and so on.	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO3	Apply various principles and techniques like knowledge representation, reasoning, game playing, planning, learning, NLP etc to provide solutions for different task domains of AI.	-	3	-	-	-	-	-	-	-	-	-	2	-	3	-
			CO4	Create solutions for AI based tasks by formalizing the problem as a state space, designing heuristics and selecting appropriate search and control techniques to solve them.	-	-	3	-	-	-	-	-	-	-	-	2	3	-	-
59	**6IT4-06**	**Distributed System**	CO1	Explain the distributed systems architecture.	-	2	1	-	-	1	-	-	-	-	-	-	2	-	-
			CO2	Outline the inter process communication in distributed systems.	-	2	2	1	-	-	-	-	-	-	-	-	-	2	-
			CO3	Apply the file accessing model and various services in distributed system.	-	2	2	1	-	-	1	-	-	-	-	2	-	2	-
			CO4	Demonstrate concurrency control and properties of transaction in Distributed systems.	-	3	3	2	2	1	1	-	2	1	-	1	-	-	2
			CO5	Evaluate resource and process management in distributed system.	-	2	2	-	-	1	1	-	-	-	-	-	2	-	-
60	**6IT5-12**	**Cloud Computing**	CO1	Identify the basic concepts, key technologies and various dimensions related to cloud computing technology.	-	3	2	-	-	-	-	-	-	-	-	-	3	3	-
			CO2	Review the architecture and infrastructure of cloud computing, including SaaS,PaaS, IaaS, public cloud, private cloud, hybrid cloud and examine various distributed programming paradigm.	-	2	3	-	-	-	-	-	-	-	-	2	2	3	-
			CO3	Evaluate Virtualization Technology used in cloud computing. Data Centers and their applications in cloud computing.	-	3	2	-	-	-	-	-	-	-	-	2	2	3	-
			CO4	Classify the various security issues and privacy policies of the enterprise adapting cloud computing principles.	-	2	3	-	-	2	-	-	-	-	-	2	-	3	2
			CO5	Create a cloud services on AWS, GoogleApp Engine etc , Integrating with cloud applications.	-	3	2	-	-	2	-	-	-	-	-	3	-	3	2
61	**6IT4-21**	**Digital Image Processing Lab**	CO1	Understand the relevant aspects of digital image representation and conversions.	-	3	2	-	3	-	-	-	-	-	3	-	-	-	-
			CO2	ability to understand the concept of edge detectors and their operation in noisy images.	-	3	2	-	3	-	-	-	-	-	3	-	2	2	-
			CO3	Ability to perform spatial and frequency domain analysis	-	2	3	-	2	-	-	-	-	-	3	-	2	2	-
			CO4	Apply the mechanisms of image compression to meet design specifications	-	2	2	-	2	-	-	-	-	-	3	-	2	2	-
			CO5	Implement the basic concept of intensities (gray levels) of an image and its histogram.	-	3	3	-	3	-	-	-	-	-	3	-	2	2	-
			CO1	State the implementation procedures for the machine learning algorithms	-	2	3	-	-	-	-	-	-	-	-	2	3	2	2

62	**6IT4-22**	**Machine Learning Lab**	CO2	Design and demonstrate Python programs for various Learning algorithms.	-	3	3	2	-	-	-	-	-	-	-	3	3	2	2
			CO3	Apply appropriate data sets to the Machine Learning algorithms	-	3	3	3	-	-	-	-	-	-	-	3	3	2	3
			CO4	Identify and apply Machine Learning algorithms to solve real world problems	-	3	3	3	-	-	-	-	-	-	-	-	3	-	-
63	**6IT4-23**	**Python Lab**	CO1	Write, Test and Debug Python Programs	2	-	-	-	3	-	-	-	1	-	-	-	1	2	-
			CO2	Implement Conditionals and Loops for Python Programs	2	-	-	-	3	-	-	-	1	-	-	-	-	2	-
			CO3	Use functions and represent Compound data using Lists, Tuples and Dictionaries	2	-	-	-	3	-	-	-	1	-	-	-	-	-	2
			CO4	Read and write data from & to files in Python and string manipulation	-	-	2	-	3	-	-	-	3	-	3	-	-	3	3
64	**6IT4-24**	**Mobile Application Development Lab**	CO1	Describe the architecture of mobile application development platforms (like Android) and analyze the hardware resource requirements for small computing devices.	-	3	3	-	-	-	-	-	-	-	-	3	2	3	-
			CO2	Explain how to implement various mobile applications using emulators and deploy them to hand-held devices.	-	2	3	-	-	-	-	-	-	-	-	3	2	3	-
			CO3	Design interactive mobile applications using various high level and low level user interface components and event processing for different real world requirements.	-	3	3	-	-	-	-	-	2	-	-	3	-	3	3
			CO4	Make use of location identification using GPS in an application	-	3	3	-	-	-	-	-	2	-	-	3	2	3	3
65	**7IT4-01**	**Big Data Analytics**	CO1	Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO2	Differentiate various big data technologies like Hadoop, MapReduce, Pig, Hive, Hbase and No-SQL	-	3	-	-	-	-	-	-	-	-	-	-	-	3	-
			CO3	Apply tools and techniques to analyze Big Data	-	3	-	-	3	-	-	-	-	-	-	-	-	-	3
			CO4	Design a solution for a given problem using suitable Big Data Techniques	-	-	3	-	3	-	-	-	-	-	-	-	-	-	3
66	**7EE6-60.1**	**Electrical Machines and Drives (OPEN ELECTIVE)**	CO1	Understand the constructional details and principle of operation of rotating electrical machines	3	-	-	3	3	-	-	-	-	-	3	-	-	-	-
			CO2	Acquire knowledge about the working principle and various aspects of electric drives.	3	-	-	2	3	-	-	-	-	-	2	-	-	-	-
			CO3	Study and analyze the various control techniques for speed control on various electric drives .	2	-	-	3	3	-	-	-	-	-	3	-	-	-	-
			CO4	Develop design knowledge on how to design the speed control and current control loops of an electric drive	3	-	-	3	2	-	-	-	-	-	3	-	-	-	-
67	**7ME6-60.2**	**Quality Management (OPEN ELECTIVE)**	CO1	Describe the basic concept of Quality Management.	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Explain a system, component, and process to meet desired needs within limits using modeling process quality and learn the concept of control charts.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO3	Illustrate the concept of Quality Assurance, Acceptance sampling and study quality systems like ISO9000, ISO 14000 and Six Sigma.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Identify engineering problems, concept of reliability and Taguchi Method of Design of experiments.	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-
68	**7EC6-60.1**	**Principle of Electronic communication (OPEN ELECTIVE)**	CO1	Describe the principles of various digital modulation systems and their properties,including bandwidth, channel capacity, transmission over bandlimited channels, inter-symbol interference (ISI), demodulation methods, and error performance in the presence of noise.	3	2	-	2	-	-	-	-	-	-	-	3	-	-	-
			CO2	Apply the concepts to practical applications in telecommunication	2	3	-	2	-	-	-	-	-	2	-	3	1	1	-
			CO3	Analyse communication systems in both the time and frequency domains.	2	3	2	-	2	-	2	-	-	-	-	3	-	2	-
			CO4	Design a communication system comprised of both analog and digital modulation techniques.	-	3	2	-	-	-	-	-	-	2	-	3	-	-	-
69	**7EC6-60.2**	**Micro and Smart System Technology (OPEN**	CO1	Explain the smart grids components and architecture	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Apply different measuring methods and sensors used in smart grid	3	3	2	-	-	-	-	-	-	-	-	-	1	-	-
			CO3	Analyze various renewable energy technologies	3	3	-	2	-	-	-	-	-	-	-	-	-	-	-
			CO4	Design various smart grid technology based devices.	-	-	3	3	3	-	-	-	-	-	-	-	1	-	1
70	**7CE6-60.1**	**Environmental Impact Analysis (OPEN ELECTIVE)**	CO1	Define terms used in Environmental impact assessment, quality standards for environmental Components	2	1	-	-	-	-	1	-	-	-	-	1	-	1	-
			CO2	Understand the concepts about EIA i.e; ecological imbalance, effects of pollution, importance of stakeholders in the EIA process	2	1	-	-	-	-	1	-	-	-	-	1	-	1	-
			CO3	Organize an environmental impact assessment for a proposed project/activity	1	2	1	-	1	1	2	-	-	-	-	2	1	1	1
			CO4	Analyze different methodologies and impacts related to EIA	1	3	1	-	1	1	2	-	-	-	-	2	1	1	1
71	**7CE6-60.2**	**Disaster Management (OPEN ELECTIVE)**	CO1	Understand concept of disasters, risks, hazards, capacity building, coping with disaster and disaster management act and policy in India	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain concept of disasters, risks, hazards, capacity building, coping with disaster and disaster management act and policy in India	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Classify disasters, risks, hazards, management techniques	1	2	1	-	-	-	-	-	-	-	-	-	-	1	1
			CO4	Apply the concept of capacity building, coping with disaster and disaster management act and policy in India	1	2	1	-	1	1	-	-	-	-	-	-	1	1	-
			CO5	Investigate natural and manmade disasters	-	2	2	1	2	1	-	-	-	-	-	-	1	-	-
72	**7IT4-21**	**Big Data Analytics Lab**	CO1	Implement the basics of data structures like Linked list, stack, queue, set and map in Java.	-	3	-	-	2	-	-	-	-	-	-	2	-	-	-
			CO2	Perform setting up Hadoop in different operating modes, install and run Pig, Hive.	-	-	3	-	3	-	-	-	-	-	-	-	-	-	2
			CO3	Apply different file management task in Hadoop Map Reduce and perform different operations on data using Pig Latin scripts and Hive.	-	-	3	-	3	-	-	-	-	-	-	-	-	-	2
			CO4	Design solutions of some real life big data applications	-	-	-	3	3	-	-	-	-	-	-	-	3	-	-
73	**7IT4-22**	**Cyber Security Lab**	CO1	Apply techniques to identify network vulnerability	-	-	3	-	-	2	-	2	-	-	-	-	2	2	-
			CO2	Perform analysis of Network traffic using network based tools	-	2	3	-	-	2	-	2	-	-	-	-	2	-	2
			CO3	Implement techniques for network scanning and simulation of Intrusion detection systems	-	1	3	-	-	2	-	1	-	-	-	-	3	-	2
			CO4	Design programs to implement encryption and network attack simulations.	-	-	3	2	-	2	-	2	-	-	-	-	2	-	2
			CO5	Design network security solution for a given case study	-	-	3	2	-	2	-	2	-	-	-	-	2	2	2
		Industrial	CO1	Identify the importance of emerging technologies and advancements	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Explain the theoretical aspects directly viewing development and other activity in industry and can decide his/her career.	-	3	-	-	-	-	-	-	-	-	-	-	-	-	2

74	7IT7-30	Industrial Training	CO3	Develop the practical skill, team work and ethical thinking while working in industry.	-	-	-	-	-	-	-	3	3	-	-	-	-	2	-
			CO4	Communicate effectively through technical presentation, report and interactions.	-	-	-	-	-	2	-	-	-	3	-	-	2	-	-
			CO5	Present and demonstrate the report using modern tools.	-	-	-	-	3	-	-	-	-	-	-	-	2	-	-
75	7IT7-40	Seminar	CO1	Identify the importance of emerging technologies and advancements.	2	-	2	2	3	2	-	-	2	2	2	2	1	3	2
			CO2	Review the present literature of any emerging technology to find suitable knowledge.	-	-	-	-	-	2	2	-	-	-	-	2	-	-	2
			CO3	Assemble the knowledge into presentable format.	-	-	-	-	-	2	2	-	2	2	2	2	-	1	1
			CO4	Write the technical report ethically.	-	-	-	-	-	-	-	3	-	-	1	2	-	1	-
			CO5	Present and demonstrate the report using modern tools.	-	-	2	2	2	-	-	-	-	-	-	3	2	-	-
76	8IT4-01	Internet of Things	CO1	Understand the definition and significance of the Internet of Things.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Discuss the architecture, operation benefits of an IoT solution.	-	2	3	-	-	-	-	-	-	-	-	-	-	-	3
			CO3	Examine the potential business opportunities that IoT can uncover.	-	2	2	-	-	-	-	-	-	-	-	-	1	2	2
			CO4	Explore the relationship between IoT and cloud computing.	1	2	3	-	-	-	-	-	-	-	-	-	2	-	-
			CO5	Identify how IoT differs from traditional data collection systems.	-	-	-	-	-	-	-	-	-	-	-	-	3	2	-
77	8EE6-60.1	Energy Audit and Demand side management (OPEN ELECTIVE)	CO1	Understand the current Energy Scenarios in India.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Illustrate the energy auditing of motors, lighting system and building, by appropriate analysis methods through survey instrumentations.	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Understand the Electrical-Load Management and Demand side Management.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	apply the Energy Conservation in transport, agriculture , household and commercial sectors.	3	2	2	1	-	-	-	-	-	-	-	-	-	-	-
78	8EE6-60.2	Soft Computing (OPEN ELECTIVE)	CO1	Learn about soft computing techniques and their applications.	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Analyze various neural network architectures.	2	2	3	-	-	-	-	-	-	-	-	-	-	2	-
			CO3	Define the fuzzy systems	-	-	3	-	-	-	-	-	-	-	-	-	1	1	-
			CO4	Understand the genetic algorithm concepts and their applications	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			CO5	Identify and select a suitable Soft Computing technology to solve the problem.	3	3	3	-	-	-	-	-	-	-	-	-	1	-	-
79	8ME6-60.1	Operations Research (OPEN ELECTIVE)	CO1	Generate mathematical models of complex engineering problems	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Analyse the various optimization techniques with the appropriate tools	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO3	Identify suitable optimization techniques to solve industrial and sociatal problems	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO4	Interpret the solution and apply the results to solve complex engineering problems	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
80	8ME6-60.2	Simulation Modeling and Analysis (OPEN ELECTIVE)	CO1	Define the simulation modeling and analyze the practical situations in organizations	3	-	-	-	-	-	-	-	-	-	-	-	1	-	1
			CO2	Examine the random numbers and random variates approach in different applications	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Investigate the sensitivity of simulation solutions for realistic problems	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Interpret the model and apply the results to solve crtitical issues of a realististic problem	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
81	8EC6-60.1	Industrial and Biomedical applications of RF Energy (OPEN ELECTIVE)	CO1	Understanding of basic concepts and Principles of EM wave, propagation reflection and transmission. [Understanding]	3	2	-	-	-	-	-	-	3	-	-	-	-	-	-
			CO2	Apply the knowledge for interest in complex dielectric constant, dipolar loss mechanism and design mechanism to understand the effect of rate rise of temperature.. [Applying & Understanding]	3	2	-	-	-	-	-	-	3	-	-	-	1	-	1
			CO3	Analyze the structure of RF heating in industrial application. [Analyzing]	3	2	3	-	-	-	-	-	3	-	-	-	1	-	-
			CO4	Design of Hazards and safety standards in various engineering problem. [Create & Design].	3	3	3	3	-	-	-	-	3	-	-	-	1	-	1
82	8CE6-60.1	Composite Materials (OPEN ELECTIVE)	CO1	Explain the basics of composites, its structure and its properties	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Compute the physio-mechanical properties of composites from tests	2	1	-	-	-	-	-	-	-	-	-	-	-	-	1
			CO3	Assessment of engineering properties of composite materials	1	2	1	-	-	-	-	-	-	-	-	-	-	-	1
			CO4	Analyze the failure and maintenance of composite materials	1	-	1	1	1	-	-	-	-	-	-	-	1	-	1
83	8CE6-60.2	Fire and Safety Engineering (OPEN ELECTIVE)	CO1	Explain the fundamentals of Fire Engineering	2	-	-	-	-	1	-	-	-	-	-	-	-	1	-
			CO2	Apply the learned principles in planning, designing and management of fire safe buildings	2	1	1	-	1	1	-	-	-	-	1	-	1	1	-
			CO3	Assess fire fighting installations, control technologies and hazardous materials	1	2	1	-	1	1	-	-	-	-	-	-	1	1	1
			CO4	Design of fire safety building for fire resitant construction by following safety legislation	1	-	1	1	1	1	-	1	-	-	-	-	-	1	1
84	8IT4-21	Internet of Things Lab	CO1	Recognize the key features of IoT in terms of computer hardware and be able to discuss their functions.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Knowledge of Raspberry Pi in Peripheral and in Trouble shooting.	-	1	3	-	-	-	-	-	-	-	-	-	-	2	-
			CO3	Analyze basic protocols in wireless sensor network.	-	2	2	-	-	-	-	-	-	-	-	-	-	-	2
			CO4	Evaluate networking technologies for application within IoT.	1	2	3	-	-	-	-	-	-	-	-	-	2	-	-
			CO5	Identify the Kits required for solving the Real-World Problem and to write the Code.	-	-	-	-	-	-	-	-	-	-	-	-	3	2	-
85	8IT4-22	Software Testing and Validation Lab	CO1	List a range of different software testing techniques and strategies in software unit test, integration and system testing.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	2
			CO2	Apply modern software testing processes in relation to software development and project management.	-	3	-	-	3	-	-	-	-	-	-	-	3	2	-
			CO3	Calculate coverage analysis and mutation scores of programs using various tools like JaBuTi, Eclemma, Jumble etc.	-	3	-	-	3	-	-	-	-	-	-	-	-	3	-
			CO4	Analyze and measure the performance of different websites using the JMeter tool	-	-	3	-	3	-	-	-	-	-	-	-	3	-	3
			CO5	Create test strategies and plans, design test cases, prioritize and execute them.	-	-	3	-	3	-	-	-	-	-	-	-	-	3	3
			CO1	Identify a complex problem by reviewing research literature	-	-	3	-	-	-	-	-	-	-	-	3	2	3	2
			CO2	Understand procedures pertaining to architecture, algorithmic design, code implementation, system integration and testing.	-	-	3	-	-	-	-	-	-	-	2	-	2	-	-
			CO3	Design a feasible solution to be undertaken as software project and in multidisciplinary environment with appropriate consideration for security and environmental issues.	-	-	-	3	3	-	-	-	-	-	-	2	3	2	2
			CO4	Implement software life cycle processes and the embodied concepts using modern tools and techniques for project implementation and development.	-	-	-	3	3	-	-	-	-	-	-	3	3	3	2

86	**8IT7-50**	**Project**	CO5	Develop effective project management, time management, leadership, oral and written communication skills with ethical behavior during the different phases of project related activities.	-	-	-	-	-	2	2	3	3	3	3	-	2	3	3
			CO6	Integrate software components and third party tools for efficient project outcomes thereby meeting customer requirements for the project.	-	-	-	-	3	-	-	-	-	-	3	-	-	3	2
			CO7	Document project report which includes feasibility study, cost estimation, project milestones and performance parameters, diagrammatic representations of different processes and system components	-	-	-	3	-	-	-	-	3	3	2	2	3	2	3
			CO8	Present and deliver the project to the stakeholders thereby demonstrating communication and teamwork skills	-	-	-	-	-	3	2	3	2	3	3	2	2	3	2